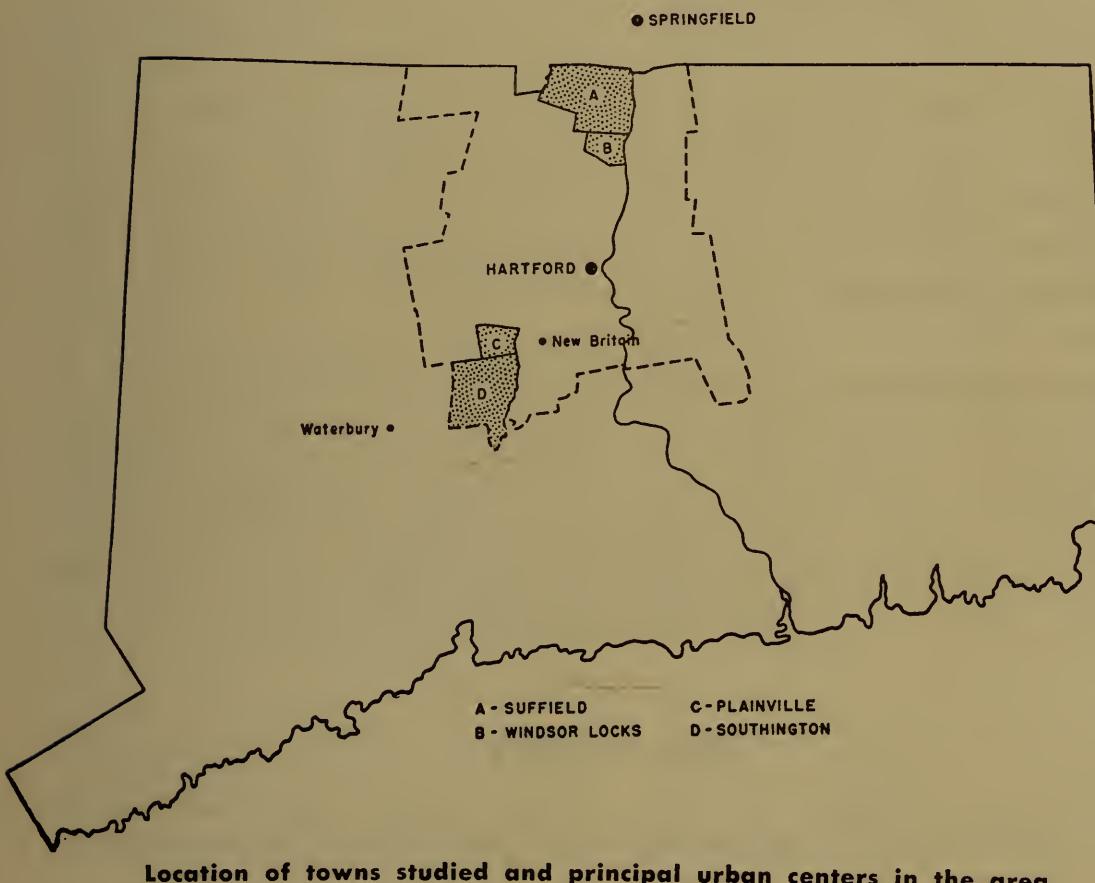


SOILS and LAND USE

Hartford County, Connecticut

**An Area of Specialized Agriculture
and Rapid Suburbanization**

Alexander Ritchie, Jr., and C. L. W. Swanson



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This is a case study of the relation of the modern soil survey to land use. During the course of the modern soil survey much information concerning soil and land use is amassed. The authors were of the opinion that some of this information was worthy of further development than is generally offered by the conventional soil survey report. With the near completion of the soil survey of Hartford County, the opportunity was at hand for the development of this idea.

Hartford County has an old, and now highly specialized agriculture. On this is being superimposed an expanding industry and a rapidly growing population, with the resulting pressure of suburbanization on the land. It furnishes a perfect example of the changes that are now occurring and may be expected to occur in the future in many parts of the country. The present land use in Hartford County can be summarized as follows: it is the expression of the experience of 10 generations of Yankees distilled by three centuries of successes, failures, and recently by suburbanization.

Soil character, using the term broadly, has always controlled man's use of land. Until fairly recently, his choice of land for a particular purpose was a matter of trial and error. The wise man,

that is, he who profited by the experience of others, "built his house upon a rock"; the foolish man "built his house upon the sand." The New England floods of 1955 pointed up clearly many unwise choices of sites for modern uses.

Today the soil survey, coupled with other soil research, with land use surveys, and with the experience of the people on the land, offers a guide for the many changes in land use that lie ahead of us, at least in many parts of the country.

The experimental analysis undertaken here may be useful both for those who relate research in soils and land use to the changing pattern brought on by suburbanization, and for those who need this information.

Hartford County

Hartford County, in north central Connecticut, is composed of 29 towns, generally called townships outside New England. The New England town is the basic political unit, chartered by the State Legislature. Within that framework it is self governing. Outside New England, the county is generally a more important political unit. Hartford is the State Capital. Hartford, East Hartford, Manchester,

New Britain, Bristol, Windsor Locks, Thompsonville, Southington, and Plainville are industrial and business centers. The population of the County in 1955 was 614,320 and is growing rapidly.

Expanding industry and business—Hartford is often called the “Insurance Capital” of the United States—has resulted in residential development throughout the County—in other words, suburbanization at an accelerating rate. Not only are new homes appearing, some in long rows, but factories, warehouses, shopping centers, filling stations, outdoor movie theaters, schools, recreational facilities, too numerous to count. Thus, pressure on the land!

Physiography

But what of the “land”? Hartford County covers 740 square miles. It lies in the three major physiographic divisions of the state, the Central Lowland, the Eastern Highland, and the Western Highland, but largely in the Central Lowland. The southeastern corner is in the Eastern Highland and a narrow strip along the western boundary in the Western Highland.

The Central Lowland occupies a belt through the center of the state, as much as 20 miles wide in places. This is essentially a lowland developed on relatively weak tilted stratified rocks from which more resistant lava flows and trap sills project as sharp unreduced ridges. In Hartford County this Lowland is divided longitudinally into two parts by one of the ridges known as Talcott Mountain. The Lowland east of this ridge is in the Connecticut River Valley: a narrower portion west of the ridge lies in the valleys of the Farmington and Quinnipiac Rivers.

Surface relief in the Lowland ranges from nearly level on the floodplains and parts of the glacio-fluvial and glaciolacustrine terraces, to rolling and hilly on the sandstone and shale hills and trap rock ridges. Elevation above sea level ranges from about 10 feet in the floodplain of the Connecticut River to about 350 feet on some of the highest sandstone and shale hills. The summits of the highest trap rock ridges are about 1000 feet above sea level.

Both the Eastern and Western Highlands of Connecticut rise abruptly from the Central Lowland. These are regions of moderate relief made up of maturely dissected resistant crystalline rock. Elevation ranges up to above 1400 feet in the Western Highland and to about 850 feet in the Eastern Highland.

Climate

Hartford County has a cool, humid modified oceanic type of climate, with moderately cold winters and mild summers. The average annual rainfall is 43 inches which is quite evenly distributed throughout the year. The heaviest rainfall is in July and August and the lightest in October and November. Severe summer droughts are uncommon though relatively short dry periods occur during summer and fall. The average frost free season is 184 days or from April 19 to October 18. The average temperature for January is 27.9 degrees; for July 72.5 degrees.

Geology

The principal rocks of the Central Lowland are sedimentary reddish sandstone, conglomerate, and shale of Triassic time, from which

protrude dikes of igneous rock known as trap (diabase or basalt). The older crystalline rocks of the Eastern and Western Highlands are mainly gneisses and schists with some granite, diorite, syenite, and pegmatite.

All of Hartford County was covered by the last continental glacier. The material that covers the bedrock in the area is clearly of glacial origin, consisting of both stratified and unstratified materials. The deposits of unstratified drifts or till form a veneer, variable in thickness, over most of the uplands, except where bedrock is exposed or is very near the surface. The stratified drift occurs in the form of terraces of assorted sands, gravel, silts, and clays over the valley floors and on the lower valley sides.

Some deposits of stratified drift are materials laid down in temporary glacial lakes and consist of sands, sand and gravel, and silts and clays. Other deposits are mainly sands and gravel laid down by streams flowing beside and between stagnant masses of ice as the glacier receded.

The Soils

The soils of Hartford County are generally developed on glacial drift, both stratified and unstratified, deposited by the late Wisconsin stage of glaciation. The soil materials were accumulated as glacial till, outwash, lacustrine, eolian, and more recently, as alluvial deposits.

The major soil series found in the Central Lowland derived from glacial till are Wethersfield, Holyoke, Cheshire, and their drainage associates.¹ The Broadbrook, Narraganset and Poquonock soils as-

sociated with the till soils consist of a shallow layer of windblown or water deposited material, chiefly of silt or sands deposited on till. In the Western and Eastern Highlands, the major series from till are Gloucester and Shapleigh.

The soils developed on outwash sands and gravels are the Merrimac, Carver, Hartford, and Bradford series and their drainage associates. The Agawam and its drainage associates have been developed on deep, fine sandy material on the lower terraces mainly along the Connecticut River.

The Melrose and its drainage associates have developed from sandy material underlain by lacustrine clays. The moderately well drained Buxton series and its drainage associates have been developed from lacustrine silt and clay.

The Hadley, Newfield, and Ondawa and their drainage associates occur on recent alluvial flood plains, which are subjected to periodic overflow.

Forest Vegetation

Hartford County lies close to the northern extremity of the Central Hardwood Region and near the southern limits of the Northern Hardwood Region. The most characteristic hardwood tree species in the former are oaks and hickories and in the latter hard maple, yellow birch, paper birch, and beech. Being located near the boundary of two vegetation zones the County has a greater representation of hardwood species than is found in many parts of the state. The conifers, hemlock, white pine, and pitch pine are also present. Chestnut was formerly an important forest component.

¹ Soils of Hartford County, 1956, The Connecticut Agricultural Experiment Station.

The common shrubs include bittersweet, blackberry, chokecherry, ground pine, mountain laurel, greenbrier, sweetpepper bush, poison ivy, hardhack, sumac, and low juniper.

Except in the steeper, very stony, and very rocky areas a large percentage of the land in the County has been cleared at one time. Some parts of the area have been heavily cut over and repeatedly burned. Consequently the forest is now largely of disturbance origin and the species present are frequently found on sites unfavorable to them, either because of chance seeding or because they were able to withstand fire. There is little merchantable timber.

The Agriculture

The first settlements in Connecticut were in Hartford County—at Windsor in 1633, at Wethersfield and Hartford shortly thereafter. All were on navigable water and at first were probably trading ventures. The only unforested land in the County was the narrow "meadows" along the main rivers. So farming began slowly—the land had to be cleared; but before the

Revolution this County, in fact the whole State, had a well developed and prosperous agriculture.

Connecticut is thought of as an industrial state, and it is. Industry started early — there was water power in abundance. Eli Whitney established his Armory in 1798 at a dam on Mill River in Hamden, but there were many who preceded and followed him. Farming prospered with the growth of villages, towns, and cities. There was good local demand for milk, butter, cheese, meat, eggs, fruits, and vegetables; and very early potatoes, onions, and turnips were sent by sloop from Wethersfield to New York.

Farming in Hartford County has changed as it has throughout the country. It is now intensive and highly specialized. The U. S. Census of 1954 reports the value of crops sold as \$28,659,917. Of this tobacco furnished about 65 per cent, potatoes about 7 per cent, fruits and vegetables, the balance. Livestock and livestock products sold amounted to \$11,480,026, making the total value of farm products sold \$40,139,943. This was almost three times that of any other Connecticut county and was exceeded

Table 1. Value of crops and livestock products sold, Hartford County, 1954*

<i>Crops</i>	
Field crops (chiefly tobacco and potatoes)	\$22,467,415
Vegetables	1,177,533
Fruits	1,636,218
Other crops	3,378,751
All crops	\$28,659,917
<i>Livestock and Livestock Products</i>	
Dairy products	\$6,057,992
Poultry and poultry products	4,501,769
Other	920,265
All livestock and livestock products	\$11,480,026
Total	\$40,139,943

* 1954 Census of Agriculture, Bureau of the Census.

in New England only by Aroostook County, Maine. It was produced on 20 per cent of the total area of the County, an indication of the high degree of specialization and the intensity of the agriculture.

Tobacco has played an important part in the economy of the County since the early days. The first settlers found the Indians growing tobacco here, but the first historical record of tobacco being grown in Connecticut was in the town of Windsor in 1640. Three varieties of cigar leaf are now grown: Broadleaf, Havana Seed, and Shade. Broadleaf and Havana Seed are cigar binder types. Shade is cigar wrapper.

Broadleaf and Havana Seed have been grown here for many years without shade. Locally they are known as "outdoor" or "stalk" tobacco—that is, the whole plant is cut and hung upside down in the curing barns. Until Shade was introduced, they were the standard binders and wrappers. Havana Seed was sometimes "primed" for wrappers. Locally one can still buy cigars wrapped with Havana Seed or Broadleaf.

Shade tobacco was first grown experimentally by this Station in Hartford County in 1900. By 1912 the crop was well established. At first seed from Sumatra was used. Later seed of a Cuban variety was secured. By selection and breeding the Station has developed from this importation the strains now used.

The "Shade" is just that—a tent of specially woven cotton cloth. This provides a "climate" that produces the thinner, smoother, lighter colored leaf now desired for cigar wrappers. The crop is "primed," that is the leaves, about four at a picking, are removed from

the stalk and taken to the curing barns.

The Two Areas Studied

In order to obtain a cross section of the relation of soils to land use, two areas represented by four towns were selected for analysis. The towns are Suffield and Windsor Locks in the northern part of the county and Southington and Plainville in the southern part. The two areas were chosen because they are different in physical features and in agriculture, but are about the same size, both have been settled for well over 200 years, have changed, as has the whole County, and are subject to about the same pressures of expanding population and industry, that is to suburbanization.

Methods Used

Land use was mapped in conjunction with soil mapping in 1950-1951. In order to avoid obscuring the soil map with the land use symbols, a transparent sheet was placed over the aerial photograph. Land use was mapped on this overlay.

The land use and soil areas were measured with a grid or acreage finder, the areas being too small to measure satisfactorily with a planimeter.

Initially, a special, detailed land use classification or "legend" was devised, a breakdown of the standard five-class legend prescribed in the U.S.D.A. Soil Survey Manual. Those five classes are Cultivated (L), Pasture (P), Idle (X), Urban (H), Forest (F). The special detailed legend provided 24 classes. For instance Cultivated (L) was divided into seven classes, as Tobacco, Corn, Vegetables, etc.² After

²The details and definitions for both legends are given on page 14.

a few towns were mapped, including Suffield and Windsor Locks, it was decided that this detailed legend was too time consuming and it was decided to discard it and use the standard five-class legend. Therefore, as will appear later, the land use data for Southington and Plainville are less detailed.

The soils were mapped in accordance with the modern classification, descriptions, and legend adopted recently by the Station and the U.S.D.A., cooperating. The system and all the soil series found in the County are fully described in the Station publication previously referred to—"The Soils of Hartford County."

Suffield-Windsor Locks

Suffield was organized as a Massachusetts Town in 1674. In 1749 it was "annexed" to Connecticut. The area is 43.1 sq. mi. and the population about 5000. Always an important agricultural town, it ranks second in Connecticut in acres of all types of tobacco, first in Havana seed, second in Shade, and third in Broadleaf. Dairying is also important. There is relatively little industry and no large community.

Suffield extends from the valley terraces westward into the heavier, rolling upland till soils. The Taconic Ridge of trap rock runs through the western part. On this are found shallow, stony soils.

Windsor Locks is a newcomer, split off from Windsor in 1854. The area is only 9.6 sq. mi. but the population over 6000. Agriculture is much less important than industry, which started early below the Falls on the Connecticut River. More recently other industries have come into the town, along with the great

Bradley Airport and its satellites. There is a lively business center.

The topography is quite level, the soils being chiefly developed from sandy, well drained terrace. This accounts for the considerable acreage of Shade tobacco.

These two towns are combined in Table 10, which groups all the soils found into Terrace, Upland, Alluvial, and Miscellaneous, and shows the use of each soil type in 1950-51, when the mapping was done.

The Land Use classification is very detailed, 24 classes having been identified (page 14). For any who have special interest in this area, Table 10, the Land Use Legend and the Soils of Hartford County, which describes each of the soils, should be studied carefully.

Table 2 shows the distribution of the total area by use classes. Over a third is in crops (which includes rotational hay), one-third in Forest, and one-tenth in Urban.

Table 3 divides the total area of the two towns into four physio-

Table 2. Percentage of total area by land use classes

Classes	Suffield-Windsor Locks	Southington-Plainville
Forest	34	55
Cropland	34	17
Pasture	13	5
Urban	10	12
Idle	7	9
Water	2	2

Table 3. Percentage of total area by physiographic classes

Classes	Suffield-Windsor Locks	Southington-Plainville
Terrace	65	40
Upland	24	47
Miscellaneous	5	6
Alluvial	4	5
Water	2	2

graphic soil groups—Terrace, Upland, Miscellaneous, and Alluvial—with the percentage of each. Note that about two-thirds is Terrace and one-quarter Upland soils.

How Are These Soils Used?

Tobacco is the important cash crop. In table 4 we find that 88 per cent of the Shade and 70 per cent of the Outdoor (Stalk) tobacco is on Terrace soils; that only 12 per cent of the Shade and 29 per cent of

tobacco; and because of high value per acre, it may be irrigated.

Corn, hay, and pasture are by no means as sensitive. Yield is what is sought. Thus they can be grown on the heavier soils that have greater water holding capacity. Pasture and hay can be grown on the steeper slopes without serious erosion problems.

Table 5 is of special interest for it gives the soil series used for Shade; the soils on which Outdoor tobacco is grown are also given.

Table 4. Relation of tobacco to physiographic positions, Suffield-Windsor Locks

Physiographic position of soils	Shade tobacco		Outdoor tobacco		Total, all types of tobacco	
	Acres	Per cent	Acres	Per cent	Acres	Per cent
Alluvial	32	1.0	32	0.8
Upland	130	11.9	898	29.1	1028	24.6
Terrace	965	88.1	2155	69.9	3120	74.6
Total	1095	100.0	3085	100.0	4180	100.0

the Outdoor is on Upland soils and these are of relatively light texture. Tobacco, especially cigar leaf, is valued for quality as well as yield.

Table 5. Soil series used for tobacco, Suffield-Windsor Locks

Soil series	Percent of total		Percent of total Shade tobacco	Percent of total Outdoor tobacco
	Merrimac (T)	Carver (T)		
Enfield (T)	34	17	10	10
Agawam (T)	14	10	8	8
Narraganset (U)	6	5	8	7
Broadbrook (U)	4	4	6	6
Sudbury (T)	3	3	6	6
Elmwood (T)	7	7	35	35
Others				

T-Terrace, U-Upland.

It is sensitive to environment—soil, fertilizers, and climate—much as are coffee and tea. Hence the selection of certain lighter soils for

Urban Use. This is becoming an important phase of land use. Table 2 tells us that in 1950-51, 10 per cent of the total area of the two towns combined was so-called Urban.³

Table 6 shows that two-thirds of the Urban land was on Terrace soils. There are several reasons:

a) The "built-up" communities of both Suffield and Windsor Locks are on Terrace.

b) The great Bradley Field airport in Windsor Locks is on Terrace.

c) Terrace soils are relatively level, free of boulders, usually offer good drainage, and permit easy excavation. Developers prefer such locations.

In Table 7 are shown the principal soils devoted to Urban use.

³ The experimental detailed scheme or Land Use Legend includes "urban areas, farmsteads, residential and commercial building sites, golf courses, airfields, dumps, gravel pits, quarries, etc." It was devised some years ago before the problems of suburbanization were so acute. Also, the motivation was quite agricultural, as has been the case in the typical soil survey.

They are all Terrace. Carver heads the list. They are loamy sands with sand and gravel subsoils and quite level.

Table 6. Urban land use in relation to physiographic position, in per cent of total Urban area

Classes	Suffield-Windsor Locks	Southington-Plainville
Terrace	65.2	52.9
Upland	20.4	11.3
Miscellaneous	13.3	34.9
Alluvial	1.1	0.9

Table 7. Urban land use in relation to major soil series in per cent of total Urban area

Suffield-Windsor Locks		
Carver (T)	29.5	
Made land	8.1	
Windsor (T)	6.1	
Elmwood (T)	4.4	
Merrimac (T)	4.4	
Total	52.5	
Southington-Plainville		
Merrimac (T)	17.9	
Hartford (T)	10.6	
Carver (T)	7.2	
Cheshire (U)	4.8	
Branford (T)	4.5	
Sudbury (T)	4.3	
Holyoke (U)	3.0	
Total	52.3	

T—Terrace, U—Upland.

A separate analysis for each of these towns might be found useful by town officials. The soil maps are available. If an up-to-date aerial photograph were made, the making of a land use map would be quite simple.

Forest. Here (Tables 8 and 9) the picture is not as clear as in the case of Tobacco or even Urban use.

Little of the so-called forest in Hartford County is now producing merchantable timber. The chestnut is gone. Some pine has been planted but many of the

stands are of less desirable species of hardwoods.

In these two towns over half of this forested land is on Terrace soils, but on areas too dry or too wet for successful cropping. In most cases they were once cultivated but later abandoned to grow up to brush and trees.

A few of the thinnest, stoniest ridges have never been tilled but have been cut and have burned. Forests are an important part of our land use pattern. Much information is available on the adaptability of species to soils ("site" is the forester's term). How to put it into greater use is a matter that deserves attention.

Table 8. Forest land use in relation to physiographic position, in per cent of total Forest area

Classes	Suffield-Windsor Locks	Southington-Plainville
Terrace	55.7	23.3
Upland	29.8	64.8
Miscellaneous	10.0	7.4
Alluvial	4.5	4.5

Nurseries provide an example of how greater use can be made of information on soil adaptation when economic returns are sufficient. In this case trees are being grown not where they are needed to cover wasteland but where they will quickly produce a root system satisfactory for transplanting.

Nurseries are largely confined to terrace soils, the same soils that are desirable for urban development and tobacco growing. These soils are easily tilled, warm up early in the spring, and are well drained; all characteristics needed for easy production of well-rooted stock. Christmas tree production would be satisfactory on terrace soils, also. However, here the eco-

nomic return is less, cultivation is rare, and root growth is less critical. Therefore, the plantations are found mainly on abandoned upland soils, soils which still retain sufficient fertility for tree growth.

Table 9. Forest land use in relation to major soil series, in per cent of total Forest area

Suffield-Windsor Locks	
Narraganset (U)	15.5
Carver (T)	12.1
Scantic (T)	6.4
Towaco (U)	6.0
Scarboro (T)	4.7
Merrimac (T)	4.1
Sandy gravelly terrace breaks	3.8
Waterboro muck	3.4
Saco (A)	3.0
Total	59.0
Southington-Plainville	
Towaco (U)	14.6
Holyoke (U)	8.3
Wethersfield (U)	7.2
Shapleigh (U)	7.0
Cheshire (U)	6.5
Gloucester (U)	6.3
Carver (T)	6.1
Wilbraham (U)	5.6
Total	61.6

A—Alluvial

Southington-Plainville

Here the situation is quite different — physically, agriculturally, industrially, and in population. Southington is rugged with little terrace soil, most of this being in Plainville. For the two towns, Upland soils account for almost half the total area, Terrace for two-fifths. In Suffield-Windsor Locks Terrace soils occupy two-thirds of the area (Table 3).

The agriculture is quite different: Large orchards, considerable vegetables (including potatoes), and dairying. No tobacco is grown.

Both Southington and Plainville have a good deal of industry, some having started early on water pow-

er; and both have relatively large business centers. Southington has two.

The population in 1950 was 23,000, and is now considerably larger. In addition to those who serve local industry and business, many people live in this area and commute to work in Hartford, New Britain, Bristol, and Waterbury.

As previously stated, the land use legend employed here was the U.S.D.A. standard five classes: Cultivated (L), Pasture (P), Idle (X), Urban (H), and Forest (F) (See page 14). Table 11 gives the use, as of 1951, in acres of each soil type mapped.

Table 2 divides the use of the total area into the five classes. Forest occupies over half. Cropland accounts for less than a fifth, and this includes orchards and hay. Table 3 partially explains this: Almost half the total area is in Upland soils, and of this, two-thirds are in Forest (Table 11). The Highland occupies the western part of both towns and there is a trap rock ridge. On these the soils are often thin or rocky. Much of the Forest is there. Table 9 lists the principal soils series found in the Forest class.

Urban Use. In Table 2 we see that 12 per cent of the area is classed Urban. This is not much greater than the 10 per cent in Suffield-Windsor Locks. One might expect with its greater population, more than double Suffield-Windsor Locks, the percentage for Southington-Plainville would be much larger. The explanation lies first in the dense population of the three thickly settled communities in the latter towns and in the classification of great Bradley airport in Windsor Locks as Urban.

In Table 7 are given the soil series on which Urban use was mapped. In both regions, the Terrace soils stand out, and generally for the same reasons.

The Relation of Land Use to Soil Type

Cropland (Cultivated, L). Agriculture in the areas studied has had well over 200 years of experience, and it is now very intensive. While a field may include two or more soil types, one part producing a poorer crop than the next, it is safe to assume that present use represents a high degree of selectivity. This is especially true for tobacco, vegetables, potatoes, and fruit. For corn and hay a farmer would be less selective, but would avoid soils that are very dry, very wet, too thin, or too rocky. Alfalfa, however, requires a favorable soil type.

Pasture (P). While some native pasture is still used by dairymen, especially for young stock, the present tendency is to grow "rotational" pasture nearer the barns. This may be Ladino, alfalfa, grasses, or mixtures. Here soil type is important.

Forest (F). Hartford county's woodland is generally poor and has not been too well managed (page 10). Of course, there are exceptions and interest is increasing. In the two areas studied, most of the woodland is found on soils not suitable to other uses. Some is on better soils, the land not being needed and allowed to revert to brush and trees.

Urban (H). Here is found a high degree of selection, for reasons already discussed. Much of the Urban is located on Terrace soils.

Idle (X). This comprises a small percentage in both areas. Soil type

seems to play a minor role. The soil may be lying idle for reasons unrelated to productivity. Much of it is probably being held for sale as urban real estate.

For Suffield-Windsor Locks the complete analysis of land use in relation to soil type is shown in Table 10. In Table 5 are listed the important soil series on which Shade tobacco is grown; those for Outdoor tobacco are also listed.

The Southington-Plainville area is analyzed in Table 11. Because the simpler five-class land use scheme was used there, the data are not so detailed.

Soil series used for Forest in both areas are given in Table 9 and for Urban uses in Table 7.

Here again it is suggested that those interested obtain "The Soils of Hartford County," which the Station will supply on request. The soil maps of most towns in Hartford County are completed. The map for a given area can be located on the key in the above publication and obtained as directed there.

Discussion

In Hartford County the pressure on the land increases as it does in many parts of the country. When the nation's population will reach 200,000,000 is not certain, but we are assured it will be soon. This means more homes, schools, stores, recreational facilities — more of everything that our modern standards demand.

Many of our cities are "built up" to the limits of their areas. With motor vehicle transportation one may live many miles from his work and enjoy "country living" with his family. That means a suburb, and suburbanization is a rapidly expanding phenomenon that we are just beginning to take seriously.

Suburbanization means new uses for land. Frequently there are no sewers and no public water supply. Septic tanks and wells are required. Fortunately, water is not too hard to reach in New England, but with unfavorable soil conditions, septic tanks may give serious trouble. For schools, shopping centers, factories, residential developments, these considerations are especially important.

Other uses require land. We need forests, if for no other reason than to regulate stream flow; and what would New England be without its trees. And we all need food, which grows on the land; and some of us need tobacco.

Farming, meaning here the growing of crops, becomes more exacting every year. Production costs are high, especially in this region. Not only yield, but quality must be considered, for as standards of living rise, so does insistence on quality. Thus the producer cannot afford to crop land that is not well suited to his crop—on only the best suited can he survive.

A problem of this nature faces all our New England tobacco growers. Shade is especially sensitive to soil conditions. In the case of the binder crop, the possible adoption of the so-called homogenized binder may change materially the demand for leaf. If so, the crop must be grown on the soils best suited.

The study here reported warrants these conclusions:

1. An accurate knowledge of our soils is basic to its best use and to intelligent planning.
2. The mapping of present use of the land is equally important, especially if one

can add the experience of the users—that is success or failure on given soil types.

3. Two kinds of Land Use classification were tried in this study:
 - a) The "standard" 5-Class scheme, and
 - b) A special 24-Class scheme.

In our opinion the "standard" scheme is not sufficiently detailed for a county like Hartford. For instance, orchards are hidden in Cultivated (L) along with vegetables, corn, potatoes, and nurseries. On the other hand, the 24-Class scheme, used in Suffield-Windsor Locks, is not perfect. It was devised as an "experiment." Forest (F) may be too detailed, but Urban (U) might well be broken into Residential (single and group separated), Industrial, Commercial, Recreational, and the like.

Land Use maps can be easily made from assessors' maps or from up-to-date air photographs. To relate them to soil type, the soil maps may be used.

In a free enterprise society such as ours, we approach land use planning and zoning with reluctance. One may do as he pleases with his land as long as it is not a nuisance to the community. But as our population grows and pressure on land and water for all uses increases, we have begun to give thought to the problems involved. Overcropping and overgrazing in the Great Plains is a case in point. Here in Hartford County, and in many other regions, we are faced with an expanding population and the "automobile exodus"—that is suburbanization. The study reported herein may offer suggestions.

Appendix

Land Use Legends

Two types of land use legends were used. One was the conventional L (cultivated), P (pasture), X (idle), H (urban), and F (forest) as described in the Soil Survey Manual. The other type is similar, but is more detailed. The units used in both legends are given below. Southington-Plainville was mapped using the conventional legend and Suffield-Windsor Locks using the detailed legend. The compilation of land use data according to soil types is given in Tables 10 and 11.

The detailed legend is a breakdown of the conventional L, P, X, H, and F classes. This breakdown made possible tabulation of information on the use of soils for individual crops such as corn, fruit, meadow, potatoes, tobacco, etc.

The units set up and the appropriate symbols are as follows:

L—Cropland (cultivated): Cropland includes all land planted to crops and, in addition, orchards, or land seeded down several years to grass, alfalfa, or other forage crops grown in rotation for hay. Meadows cut for hay and then grazed later in the season are included in this class. Rotation pasture which is usually plowable (as distinguished from permanent pasture) is included in the pasture classification.

L_c—Corn land: Land used for the growing of corn.

L_f—Fruit land: Land used for the growing of fruit.

L_m—Meadow land: Land used for meadow, hay land and/or green manuring purposes. The crops grown may be grasses, either wild or seeded, or legumes such

as alfalfa, Ladino clover, soybeans, or similar crops, and may be used either for hay or for green manuring purposes.

L_p—Potatoes: Land used for the growing of potatoes.

L_t—Tobacco: Land used for the growing of Shade tobacco.

L_h—Tobacco: Land used for the growing of Havana seed and Broadleaf tobacco, without shade.

L_v—Vegetables: Land used for the growing of vegetables and sweet corn (market gardening), and land used for nurseries.

F—Forest: Land with 40 per cent or more of the ground covered by a canopy of trees of any age, and land devoted to forest plantations. Forest land may or may not be pastured. Several subdivisions of forest land were made in order to show in a general way the type and age of forest cover. An attempt was made to designate the main type of tree cover, i.e., whether it is composed chiefly of conifers, hardwoods, or mixed conifers and hardwoods (see below).

All tree species and stand sizes were based on observation of the stand as a generalized mapping unit. Species that dominated the stand determined the forest land subdivision used. Forest land subdivision units were estimated by making a reconnaissance of the area.

Two age or size stages were recognized. *Young forest*⁴ (seedling-sapling stage), and *forest* (pole and timber stages).

The following are the arbitrary age group designations of trees as indicated by their size:

Stage	Height in feet
Seedling-sapling	0-30
Pole	31-60
Timber	61 and over

⁴This category includes what is commonly known in New England as "old field" stage of forest.

The symbols and definitions for forest land are as follows:

F_c —Forest: Approximately 75 per cent or more of the tree species are conifers, and 25 per cent or more of the canopy is formed by trees in the pole or timber stage.

F_h —Forest: Approximately 75 per cent or more of the tree species are hardwoods, and 25 per cent or more are in the pole or timber stage.

F_m —Forest: A mixture of hardwood and conifer species where neither the hardwoods nor the conifers comprise 75 per cent or more of the stand.

F_{yc} —Young forest: Approximately 75 per cent or more of the tree species are conifers, but less than 25 per cent of the canopy is in the pole or timber stage.

F_{yb} —Young forest: Approximately 75 per cent or more of the tree species are hardwoods, and less than 25 per cent of the canopy is in the pole or timber stage.

F_{ym} —Young mixed forest: Same as F_m but the stand is in the seedling-sapling stage.

P —Pasture land: This class includes both permanent and rotational pasture. In comparison with land in rotation pastures, permanent pasture land usually is not plowable. Pasture land has less than 40 per cent of tree canopy. Brushy pasture has more than 40 per cent brush whereas the other kinds of pasture have less than 40 per cent brush. Brush is differentiated from trees by the fact that brush consists of non-tree forming species including mountain-laurel, witch hazel, sumac, hawthorn, sweet fern, and bayberry.

There are many areas now used for pasture where brush or trees are moving in. Ecologically, this tendency of trees to take over grassland is a regional characteristic. In

order to show the extent and nature of this reversion to forest, several categories of pasture land are set up within this general land use class. These subdivisions show in a general way the type of tree or brush cover on the pasture land and are defined as follows:

P_h —Permanent pasture: Land with less than 40 per cent of the area covered by a canopy of trees (or more than 200 seedlings or saplings per acre) that are predominantly hardwoods, i.e., 75 per cent or more are hardwoods.

P_c —Same as P_h except the seedlings, saplings, or trees are predominantly conifers.

P_m —Permanent pasture: Land with less than 40 per cent of the area covered by tree canopy (or 200 or more tree seedlings or saplings per acre) of mixed hardwood and coniferous trees.

P_g —Permanent pasture: Land essentially free of trees and brush (less than 5 per cent trees or brush) and in grass.

P_r —Rotation pasture: Land seeded to grasses and legumes for pasture purposes. This kind of land is plowable as distinguished from permanent pasture described above. Usually it is used in rotation with other crops over a given period of years but not necessarily in any given sequence.

PB —Brushy pasture land: This includes land that has more than 40 per cent of the area in brush. If the land has more than 40 per cent tree canopy it is classed as forest as defined above. If it has less than 40 per cent tree canopy (or over 200 tree seedlings or saplings per acre) the area will be classed as P_m , P_h , or P_c .

X —Idle land: Idle land is land that is either without (void of) vegetation or maintains plant growth that is of little economic or agri-

cultural value. It includes land having no evidence of recent previous forest occupancy and also abandoned land which was previously used for pasture or cultivation. In some cases this abandoned land can be returned to agricultural field crop or pasture. This land has less than 40 per cent of the area covered by tree canopy (or less than 200 tree seedlings or saplings per acre) and may carry a cover of grass or brush or various mixtures of trees, brush, and grass. The plant cover on idle land may have considerable value as a food source for wildlife and may have sufficient stocking of young valuable trees for later forest development.

X_h -Idle land: Land carrying a cover of 75 per cent or more of the trees or seedlings predominantly of hardwood species. The tree canopy covers less than 40 per cent of the area or there are at least 200 seedlings and saplings per acre.

X_c -Idle land: Similar to X_h except that the trees or seedlings are predominantly of coniferous species.

X_m -Idle land: Similar to X_c except that the cover is predominantly mixed hardwood and coniferous tree species.

X_g -Idle land: in grass or weeds, less than 5 per cent trees (recently abandoned land, resting land).

X_w -Wasteland: Idle land that is either without vegetation or maintains plant growth of little economic value. Such areas include large outcrops of bedrock, sand plains such as the Wallingford Sand Plains, abandoned gravel and sand pits, mine dumps, quarries, and the like. These areas may be useful for wildlife development.

H-Urban areas: Urban areas, large farmsteads, town sites, golf courses, and areas not otherwise classified are included in class H.

Hartford County Soils and Land Use

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Table 10. Acreage and Use of Soils in Suffield and Windsor Locks, Connecticut: Terrace Soils

Soil Series	Soil Symbols	Carver			Hartford			Hinckley			Manchester			Merrimac			
		708		C-1	746		B-1	606		A-Δ	B-C-Δ	BC-Δ	628		B-1	A-1	
		A-1	B-1	C-1	A-1	B-1	A-Δ	B-C-Δ	A-1	B-C-Δ	BC-Δ	BC-Δ	A-1	B-1	A-1	B-1	
Urban areas	H	849	69	15	6	2	7	53	0	12	0	5	14	118	11	11	
Cultivated	L _a	633	112	5	29	55	14	96	3	62	1	135	16	638	123	123	
Tobacco	L _t	213	42	1	4	28	0	1	0	27	0	12	2	165	64	64	
Tobacco	L _c	175	9	0	0	3	5	21	0	3	0	87	0	276	9	9	
Corn	L _e	42	11	0	1	1	0	39	1	6	0	2	9	57	13	13	
Fruit	L _r	1	10	0	0	0	0	0	0	1	0	0	0	7	10	10	
Meadow	L _m	20	16	1	24	21	9	33	2	18	1	26	5	110	25	25	
Potatoes	L _p	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Vegetables	L _v	182	24	3	0	2	0	2	0	2	7	0	8	0	22	2	
Forest	1042	153	105	0	2	0	327	0	14	0	57	20	233	126	126	126	
Hardwoods	F _b	195	47	13	0	1	0	30	0	14	0	44	6	80	62	62	
Conifers	F _c	26	2	0	0	0	0	9	0	0	0	0	0	0	2	0	
Mixed	F _{in}	37	0	8	0	0	0	88	0	0	0	9	0	60	5	5	
Young, hdwds.	F _{yhd}	546	84	81	0	1	0	109	0	0	0	0	0	14	40	50	
Young, conif.	F _{yc}	88	11	1	0	0	0	1	0	0	0	0	0	0	2	0	
Young, mixed	F _{ym}	150	9	2	0	0	0	90	0	0	0	4	0	49	9	9	
Pasture land	9	19	2	6	4	0	13	0	10	3	4	0	0	20	20	20	
Grass	P _g	3	15	2	6	2	0	8	0	5	3	2	0	12	15	15	
Brushy	P _B	3	0	0	0	0	0	0	0	3	0	0	0	0	0	2	
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P. hdwds.	P _h	3	4	0	0	2	0	0	0	2	0	0	0	0	2	0	
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	
P. rotation	P _r	0	0	0	0	0	0	5	0	0	0	2	0	0	3	3	
Idle land	421	50	3	3	7	0	79	2	22	0	35	0	35	0	38	14	
Grass	X _g	390	43	2	3	6	0	75	0	22	0	33	0	88	12	12	
Hardwoods	X _h	12	7	0	0	1	0	2	0	0	0	2	0	0	0	0	
Conifers	X _c	12	0	1	0	0	0	0	0	0	0	0	0	0	2	2	
Mixed	X _m	7	0	0	0	0	0	2	0	0	0	0	0	0	0	0	
Total by mapping unit		2954	403	130	44	70	21	568	5	120	4	236	50	1097	294		
Total for soil			3487		114				594		124					1677	

Terrace Soils — Continued

Soil Series	Soil Symbols	Sudbury						Enfield						Elmwood					
		45V			455			456			63V			84V			846		
		A-1	B-1	A-1	A-1	B-1	A-1	A-Δ	B-Δ	C-Δ	A-1	B-1	A-1	B-1	A-1	B-1	A-1	B-1	A-1
Urban areas	H	11	0	7	31	0	0	0	0	1	48	10	58	23	0	0	0	0	0
Cultivated		56	5	38	239	6	3	18	1	396	172	268	150	33					
Tobacco	L _h	17	0	12	99	0	1	7	0	119	30	123	39	13					
Tobacco	L _t	5	2	1	32	0	0	1	0	10	1	7	10	0					
Corn	L _e	4	0	1	21	0	2	4	0	71	30	22	18	15					
Fruit	L _r	5	3	0	0	0	0	0	0	0	2	0	1	0					
Meadow	L _m	20	0	9	68	6	0	6	1	148	99	82	64	4					
Potatoes	L _p	2	0	0	2	0	0	0	0	24	0	14	5	1					
Vegetables	L _v	3	0	15	17	0	0	0	0	24	10	20	13	0					
Forest		19	5	20	79	7	0	0	0	60	39	91	58	1					
Hardwoods	F _h	14	0	17	38	2	0	0	0	46	36	52	49	1					
Conifers	F _c	0	0	0	12	0	0	0	0	0	2	0	2	0					
Mixed	F _m	1	0	0	3	0	0	0	0	0	0	0	1	3					
Young, hdwds.	F _{y_h}	3	5	3	18	5	0	0	0	14	1	38	4	0					
Young, conif.	F _{y_c}	1	0	0	0	0	0	0	0	0	0	0	0	0					
Young, mixed	F _{y_m}	0	0	0	8	0	0	0	0	0	0	0	0	0					
Pasture land		13	0	2	23	0	0	0	0	83	57	45	60	5					
Grass	P _g	4	0	2	8	0	0	0	0	56	40	33	42	5					
Brushy	P _B	0	0	0	4	0	0	0	0	4	8	3	0	0					
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0	0					
P. hdwds.	P _h	0	0	0	7	0	0	0	0	7	5	5	4	0					
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0	0					
P. rotation	P _r	9	0	0	4	0	0	0	0	16	4	4	14	0					
Idle land		7	0	2	20	0	0	4	0	18	16	20	40	0					
Grass	X _g	7	0	2	16	0	0	4	0	16	16	20	24	0					
Hardwoods	X _h	0	0	3	0	0	0	0	0	2	0	0	16	0					
Conifers	X _c	0	0	0	0	0	0	0	0	0	0	0	0	0					
Mixed	X _m	0	0	1	0	0	0	0	0	0	0	0	0	0					
Total by mapping unit		106	10	69	392	13	3	22	2	605	294	482	331	39					
Total for soil					590				27					1751					

Hartford County Soils and Land Use

Terrace Soils — Continued

Terrace Soils — Continued

Terrace Soils — Continued

Soil Series	Soil Symbols	Ninigret				Windsor				Enfield				Rahway				Scantic				Total Terrace Soils
		152V	A-1	B-1	1526	A-1	B-1	C-1	A-1	B-1	A-1	B-1	A-1	B-1	A-1	B-1	A-1	A-1	A-1	A-1		
Urban areas	H	14	36	15	2	52	115	27	10	8	0	4	0	60	0	60	2	2067				
Cultivated		281	22	115	9	157	115	27	220	32	5	11	0	1028	0	1028	222	8331				
Tobacco	L _a	110	6	69	3	130	53	11	41	11	0	7	0	21	0	21	10					
Tobacco	L _c	3	0	1	0	0	10	0	145	6	0	0	0	0	0	0	0	0				
Corn	L _c	34	4	2	0	7	18	8	2	1	0	3	0	70	0	70	24					
Fruit	L _r	0	0	0	0	0	1	0	0	1	0	0	0	5	0	5	0					
Meadow	L _m	112	7	30	4	12	17	2	30	12	5	1	0	891	0	891	178					
Potatoes	L _p	4	2	6	0	1	4	0	0	0	0	0	0	0	0	0	0	21	10			
Vegetables	L _v	18	3	7	2	7	12	6	2	1	0	0	0	0	0	0	0	20	0			
Forest		136	3	117	0	68	259	74	30	0	0	0	0	2	630	0	630	54	5983			
Hardwoods	F _a	68	1	98	0	49	148	32	7	0	0	0	0	2	430	0	430	38				
Conifers	F _c	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	1	0			
Mixed	F _m	8	0	0	0	1	37	1	20	0	0	0	0	0	0	0	0	5	1			
Young, hdwds.	F _{yh}	58	2	18	0	7	54	39	3	0	0	0	0	0	0	0	0	189	15			
Young, conif.	F _{yc}	2	0	1	0	11	5	0	0	0	0	0	0	0	0	0	0	0	0			
Young, mixed	F _{ym}	0	0	0	0	0	7	2	0	0	0	0	0	0	0	0	0	5	0			
Pasture land		30	4	4	0	5	3	3	0	1	0	0	0	6	795	0	795	42	2676			
Grass	P _g	17	0	3	0	0	1	3	3	0	0	0	0	6	595	0	595	32				
Brushy	P _B	7	1	1	0	5	0	0	0	0	0	0	0	0	0	0	0	63	1			
P. confif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
P. hdwds.	P _h	2	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	26	6			
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
P. rotation	P _r	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	3			
Idle land		19	2	22	3	40	58	25	2	4	0	1	4	0	1	4	0	272	14	1748		
Grass	X _g	14	2	22	3	40	51	22	0	2	0	1	3	0	1	3	0	190	12			
Hardwoods	X _h	5	0	0	0	0	3	3	2	2	0	0	0	1	1	44	2					
Conifers	X _c	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	38	0			
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Total by mapping unit		480	67	273	14	322	550	156	265	44	6	16	12	331	12	2785	334					
Total for soil					834				1028					331				3119	20805			

Table 10. Acreage and Use of Soils in Suffield and Windsor Locks, Connecticut: Upland Soils

Soil Series	Soil Symbols	Cheshire						Holyoke			Ludlow						
		375	A-1	B-1	B-2	C-1	D-1	375X	A-1	B-1	C-1	094	B-1	D-1	A-1	B-1	C-1
Urban areas	H	0	6	0	0	0	0	0	27	0	0	0	9	21	0	0	0
Cultivated	L _h	6	46	21	0	0	0	6	144	5	2	0	83	150	0	0	0
Tobacco	L _t	0	24	5	0	0	0	3	82	0	0	0	29	22	0	0	0
Tobacco	Corn	0	0	0	0	0	0	0	11	3	0	0	0	0	0	0	0
Corn	L _c	0	2	5	0	0	0	2	14	0	0	0	9	20	0	0	0
Fruit	L _f	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
Meadow	L _m	6	19	11	0	0	0	1	32	2	2	0	42	104	0	0	0
Potatoes	L _p	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Vegetables	L _v	0	1	0	0	0	0	0	0	0	0	0	0	3	2	0	0
Forest	0	2	0	4	8	50	0	3	0	11	29	23	9	0	0	0	0
Hardwoods	F _h	0	2	0	1	8	50	0	1	0	11	29	20	6	0	0	0
Conifers	F _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed	F _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Young, hdwds.	F _{yh}	0	0	0	0	0	0	0	2	0	0	0	0	3	0	0	0
Young, conif.	F _{yc}	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Young, mixed	F _{ym}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pasture land	0	11	0	0	2	0	0	2	6	0	2	0	26	34	0	0	0
Grass	P _g	0	7	0	0	0	0	0	4	0	0	0	17	30	0	0	0
Brushy	P _B	0	4	0	0	2	0	0	2	0	2	0	0	0	0	0	0
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. hdwds.	P _h	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. rotation	P _r	0	0	0	0	0	0	2	0	0	0	0	9	4	0	0	0
Idle land	0	4	0	0	1	0	0	5	0	0	0	0	14	2	0	0	0
Grass	X _g	0	1	0	0	1	0	0	5	0	0	0	6	3	2	0	0
Hardwoods	X _h	0	3	0	0	0	0	0	0	0	0	0	2	11	0	0	0
Conifers	X _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total by mapping unit		6	69	21	4	11	50	8	185	5	15	29	149	228	2		
Total for soil													242				

Hartford County Soils and Land Use

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Upland Soils — Continued

Soil Series	Soil Symbols	Towaco																	
		Ludlow				Menlo				Sunderland									
		B-1	BC-1	564X	564M	543	543X	034	A-1	BC-1	034L	BC-1	DEF-1	BC-1	944	944L	BC-1	DEF-1	BC-1
Urban areas	H	0	0	0	0	0	0	3	11	0	0	0	0	0	0	0	0	0	0
Cultivated	L _n	2	0	5	1	13	4	2	0	0	0	3	0	0	0	0	0	0	0
Tobacco	L _t	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Tobacco	L _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corn	L _r	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Fruit	Meadow	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Potatoes	L _m	0	0	0	0	0	0	10	2	0	0	3	0	0	0	0	0	0	0
Vegetables	L _p	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vegetables	L _v	18	0	22	2	10	2	14	0	0	0	0	0	0	0	0	0	0	0
Forest	F _n	2	0	1	0	2	0	0	0	0	0	14	0	0	0	0	0	0	0
Hardwoods	F _e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conifers	F _m	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed	Young, hdwds.	6	0	0	3	2	6	0	0	0	0	0	0	0	0	0	0	0	0
Young, conif.	F _{yh}	0	3	0	0	0	2	0	0	0	0	9	0	0	0	0	0	0	0
Young, mixed	F _{ym}	0	11	0	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Pasture land	Grass	24	24	3	14	2	11	0	0	0	0	3	3	3	3	2	3	5	5
Grass	Brushy	10	1	3	5	1	7	0	0	0	0	2	3	3	3	0	0	0	0
Brushy	P. conif.	14	23	0	7	0	4	0	0	0	0	1	0	0	0	0	0	0	0
P. conif.	P. hdwds.	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0
P. hdwds.	P. mixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. mixed	P. rotation	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
P. rotation	Idle land	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	6	0	0
Idle land	Grass	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0
Grass	Hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0
Hardwoods	Conifers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Conifers	Mixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total by mapping unit		34	42	8	37	20	38	2	14	3	179	147	16	149	185				
Total for soil			455	45							74						679		

Upland Soils—Continued

Soil Series	Soil Symbols	Wethersfield						Wilbraham					
		384			384M			384X			284		
		A-1	B-1	B-2	C-1	C-2	C-3	D-2	D-3	E-2	B-1	D-1	DEF-1
Urban areas	H	9	42	67	6	29	2	4	0	2	0	0	4
Cultivated		16	58	170	2	55	14	10	11	0	0	0	129
Tobacco	L _h	9	10	60	0	12	5	0	0	0	0	11	0
Tobacco	L _t	0	0	0	0	0	0	0	0	0	0	0	0
Corn	L _c	0	10	15	0	7	1	2	4	0	0	0	15
Fruit	L _f	0	0	1	0	0	2	0	4	0	0	0	0
Meadow	L _m	6	33	86	2	28	5	8	3	0	0	0	88
Potatoes	L _p	0	0	0	0	7	0	0	0	0	0	0	0
Vegetables	L _v	1	5	8	0	1	0	0	0	0	0	0	15
Forest	9	39	17	17	4	2	21	0	1	8	16	1	12
Hardwoods	F _h	9	32	4	8	3	2	9	0	0	7	1	5
Conifers	F _c	0	0	12	0	0	0	0	0	0	0	0	0
Mixed	F _m	0	0	0	0	0	0	0	0	0	0	0	0
Young, hdwds.	F _{yh}	0	5	0	9	1	0	10	0	1	8	8	6
Young, conif.	F _{yc}	0	2	0	0	0	0	0	0	0	1	0	0
Young, mixed	F _{ym}	0	0	1	0	0	0	2	0	0	0	0	0
Pasture land	0	11	20	5	15	0	6	4	3	11	0	26	52
Grass	P _g	0	3	10	5	15	0	3	4	3	11	0	41
Brushy	PB	0	2	0	0	0	0	0	0	0	0	26	2
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0
P. hdwds.	P _h	0	1	3	0	0	0	3	0	0	0	1	0
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0
P. rotation	P _r	0	5	7	0	0	0	0	0	0	0	0	0
Idle land	0	13	45	9	22	2	6	0	0	0	0	0	14
Grass	X _g	0	12	37	9	21	2	6	0	0	0	0	13
Hardwoods	X _h	0	1	8	0	1	0	0	0	0	0	1	8
Conifers	X _c	0	0	0	0	0	0	0	0	0	0	0	0
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0	0
Total by mapping unit		34	163	319	39	125	20	47	15	6	19	16	27
Total for soil											211	88	164
											830	463	

Upland Soils — Continued

Soil Series	Soil Symbols	Broadbrook						Rainbow								
		A-1	B-1	B-2	C-1	C-2	D-1	D-2	A-1	B-1	C-1	D-1	A-1	B-1	A-1	B-1
Urban areas	H	38	84	39	9	4	0	1	1	0	0	6	18	0	0	0
Cultivated	I _h	105	209	275	5	89	1	8	0	0	0	56	34	5	0	0
Tobacco	I _a	47	85	94	0	18	0	2	0	0	0	14	8	0	0	0
Tobacco	I _t	9	3	41	0	2	0	0	0	0	0	0	0	0	0	0
Corn	I _c	11	35	43	2	15	0	2	0	1	0	0	7	6	0	0
Fruit	I _f	2	4	4	0	1	0	0	0	0	0	0	0	0	0	0
Meadow	I _m	29	76	73	3	44	1	4	0	0	0	0	28	18	5	0
Potatoes	I _p	0	0	5	0	2	0	0	0	0	0	0	3	0	0	0
Vegetables	I _v	7	6	15	0	7	0	0	0	6	0	0	4	2	0	0
Forest	F _h	2	44	9	34	13	0	3	1	46	18	21	6	9	7	7
Hardwoods	F _m	1	30	1	31	3	0	0	0	3	1	2	0	4	0	0
Conifers	F _e	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Mixed	F _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Young, hdwds.	F _{yh}	0	14	7	0	3	0	3	1	43	9	19	4	5	7	0
Young, conif.	F _{yc}	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0
Young, mixed	F _{ym}	0	0	0	0	0	0	0	0	0	8	0	2	0	0	0
Pasture land	P _g	1	31	25	2	16	0	0	3	2	3	2	3	17	14	4
Grass	P _g	0	25	17	0	11	0	0	3	2	0	0	14	7	4	0
Brushy	P _B	0	6	5	2	0	0	0	0	0	0	0	0	0	0	0
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. hdwds.	P _h	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P. rotation	P _r	1	0	2	0	5	0	0	0	0	0	3	3	7	0	0
Idle land	P _r	6	21	31	2	8	2	0	2	0	0	4	4	0	0	0
Grass	X _g	6	21	31	2	8	2	0	0	0	0	4	4	0	0	0
Hardwoods	X _h	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0
Conifers	X _c	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total by mapping unit		152	389	379	52	130	3	12	4	59	20	24	89	79	16	7
Total for soil													1224		191	

Upland Soils — Continued

Hartford County Soils and Land Use

Upland Soils — Continued

Soil Series	Soil Symbols	Wapping						Poquonock						Total Upland Soils	
		154V		154VX		076		A-1		B-1		C-1			
		A-1	B-1	A-1	B-1	A-1	B-1	C-1	D-1	A-1	B-1	C-1	D-1		
Urban areas	H	0	2	0	0	7	120	13	19	0	16	0	645		
Cultivated		6	20	0	0	42	240	16	2	2	36	13	2537		
Tobacco	L _n	6	0	0	0	30	148	4	2	2	21	9			
Corn	L _t	0	0	0	0	0	0	0	0	0	0	0			
Fruit	L _c	0	5	0	0	2	16	2	0	0	0	12	0		
Meadow	L _t	0	0	0	0	1	0	0	0	0	0	0			
Potatoes	L _m	15	0	0	9	66	7	0	0	0	0	4			
Vegetables	L _p	0	0	0	0	0	2	0	0	0	0	0			
L _v		0	0	0	0	0	8	3	0	0	3	0			
Forest		0	1	0	81	1	52	10	23	0	8	0	3211		
Hardwoods	F _n	0	0	0	23	1	23	5	0	0	6	0			
Conifers	F _c	0	0	0	0	0	0	2	0	0	0	0			
Mixed	F _m	0	0	0	4	0	1	1	0	0	0	0			
Young, hdwds.	F ^{yh}	0	1	0	29	0	28	2	23	0	0	0			
Young, confif.	F ^{yc}	0	0	0	0	0	0	0	0	0	2	0			
Young, mixed	F ^{ym}	0	0	0	25	0	0	0	0	0	0	0			
Pasture land		0	0	4	4	0	15	1	0	0	2	0	806		
Grass	P _g	0	0	4	2	0	6	0	0	0	2	0			
Brushy	P _{BB}	0	0	0	2	0	1	0	0	0	0	0			
P. comif.	P _c	0	0	0	0	0	0	0	0	0	0	0			
P. hdwds.	P _h	0	0	0	0	0	0	0	0	0	0	0			
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0			
P. rotation	P _r	0	0	0	0	0	8	1	0	0	0	0			
Idle land		6	0	0	0	3	17	2	11	0	8	0	337		
Grass	X _g	6	0	0	0	3	12	2	11	0	8	0			
Hardwoods	X _h	0	0	0	0	5	0	0	0	0	0	0			
Conifers	X _c	0	0	0	0	0	0	0	0	0	0	0			
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0			
Total by mapping unit		12	23	4	85	53	444	42	55	2	70	13			
Total for soil												679	7536		

Table 10. Acreage and Use of Soils in Suffield and Windsor Locks, Connecticut: Alluvial Soils

Soil Series Soil Symbols		Cromwell		Hadley		Newfield		Ondowa		Podunk		Rumney		Saco		Winooski	
		71V A-1	29V A-1	121V A-1	80V A-1	81V A-1	853 A-1	855 A-1	823 A-1	825 A-1	04V A-1	Total Alluvial Soils					
Urban areas	H	0	10	0	6	0	0	0	0	0	10	8	2	36			
Cultivated		8	41	5	23	7	2	8	3	9	8	5	5	119			
Tobacco	L _a	8	8	3	3	2	2	0	2	0	2	0	0	0	0	0	0
Tobacco	L _t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corn	L _c	0	11	0	13	1	0	0	1	0	0	0	0	1			
Fruit	L _f	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meadow	L _m	0	0	0	3	4	0	8	0	9	6	0	0	0	0	0	0
Potatoes	L _p	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vegetables	L _v	0	22	2	4	0	0	0	0	0	0	0	0	0	4	4	480
Forest	5	15	9	9	8	0	67	45	72	246	4						
Hardwoods	F _h	5	15	9	0	0	0	51	14	0	124	4					
Conifers	F _c	0	0	0	9	0	0	0	0	0	0	0	2	0			
Mixed	F _m	0	0	0	0	0	0	0	0	0	38	8	0				
Young, hdwds.	F _{yh}	0	0	0	0	8	0	16	31	34	88	0					
Young, conif.	F _{yc}	0	0	0	0	0	0	0	0	0	0	3	0				
Young, mixed	F _{ym}	0	0	0	0	0	0	0	0	0	0	21	0				
Pasture land		2	0	1	1	0	4	327	5	89	68	1	498				
Grass	P _g	0	0	0	0	0	0	229	5	30	28	1					
Brushy	P _B	0	0	0	1	1	0	6	0	31	9	0					
P. conif.	P _c	0	0	0	0	0	0	0	0	0	0	0	0				
P. hdwds.	P _h	2	0	0	0	0	1	92	0	28	31	0					
P. mixed	P _m	0	0	0	0	0	0	0	0	0	0	0	0				
P. rotation	P _r	0	0	0	0	0	0	0	0	0	0	0	0				
Idle land		3	8	0	2	4	3	17	6	52	28	0					
Grass	X _g	3	0	0	2	4	3	13	3	33	26	0					
Hardwoods	X _h	0	8	0	0	0	0	4	3	1	2	0					
Conifers	X _c	0	0	0	0	0	0	0	0	18	0	0					
Mixed	X _m	0	0	0	0	0	0	0	0	0	0	0					
Total by mapping unit		18	74	15	41	19	9	419	59	232	358	12					
Total for soil								478	56	590	590	1256					

Table 10. Acreage and Use of Soils in Suffield and Windsor Locks, Connecticut: Miscellaneous Land Types

Table 11. Acreage and Use of Soils in Southington and Plainville, Connecticut: Terrace Soils

Soil Series	Swanton			Sudbury			Walpole			Hinckley			Rathum		
	06V			45V			456			466			606		
	A-1	A-1	A-1	A-1	B-1	A-1	A-1	A-1	A-1	A-Δ	BC-Δ	BC-Δ	A-Δ	BC-Δ	
Cultivated	L	0	3	18	177	0	75	15	4	25	42	7	7	184	
Pasture land	P	13	4	1	30	0	80	3	3	1	1	0	0	15	
Forest	F	9	0	8	232	1	162	59	9	102	158	0	0	22	
Urban areas	H	1	4	0	184	0	33	13	11	5	11	0	0	52	
Idle land	X	6	5	2	222	0	86	52	14	22	26	0	0	48	
Total		29	16	29	845	1	436	142	41	155	238	7	7	321	

Terrace Soils — Continued

Soil Series	Manchester			Windsor			Agawam			Merrimac					
	626			628			678			696			705		
	A-Δ	BC-Δ	BC-Δ	B-1	C-1	A-1	B-1	A-1	B-1	A-1	B-1	A-1	B-1		
Cultivated	L	15	292	26	0	0	5	4	0	16	3	36	374	76	
Pasture land	P	3	47	14	0	0	8	0	0	0	0	0	10	5	
Forest	F	11	401	34	5	5	0	0	3	1	0	7	355	58	
Urban areas	H	0	133	7	0	0	0	0	0	0	0	4	678	85	
Idle land	X	0	79	16	0	0	1	0	0	4	0	5	154	16	
Total		29	952	97	5	5	14	4	3	21	3	52	1571	240	

Terrace Soils—Continued

Soil Series	Carver						Hartford						Scarboro			Ellington	
	708			745			746			748			754		764		
	A-1	B-1	C-1	A-1	B-1	A-1	B-1	A-1	B-1	C-1	A-1	B-1	A-1	A-1	A-1	A-1	
Soil Symbols																	
Cultivated	L	192	39	2	0	0	302	134	43	20	0	16	45				
Pasture land	P	8	11	1	7	2	15	8	1	1	0	93	31				
Forest	F	464	499	58	0	1	202	40	397	101	39	46	27				
Urban areas	H	261	44	3	0	0	312	42	90	13	0	4	54				
Idle land	X	217	24	10	0	0	132	30	62	9	0	74	43				
Total		1142	617	74	7	3	963	254	592	144	39	233	200				

Terrace Soils—Continued

Soil Series	Whately						Branford						Penwood			Saugatuck			Ninigret	
	Elmwood			846			1384			1408			1515		152V		1526		Total	Terrace Soils
	A-1	B-1	A-1	A-1	B-1	A-1	A-1	B-1	C-1	A-1	B-1	C-1	A-1	A-1	A-1	A-1	A-1	A-1		
Soil Symbols																				
Cultivated	L	3	0	4	0	476	244	4	32	0	0	0	2	2	0	1	1	492		
Pasture land	P	1	0	14	2	27	23	0	2	5	0	0	11	0	0	0	6	3845		
Forest	F	7	4	5	8	47	84	89	68	0	19	0	8	0	0	0	4	2271		
Urban areas	H	0	0	2	0	137	56	1	34	0	0	0	0	0	0	0	3	1489		
Idle land	X	0	0	0	0	49	13	31	0	0	0	0	0	0	0	0	3	11072		
Total		11	4	25	10	736	420	125	155	5	19	3	34	3	34	34	34	11072		

Table 11. Acreage and Use of Soils in Southington and Plainville, Connecticut: Upland Soils

Soil Series	Sunderland						Shapleigh						Holyoke 094					
	034	034M	034R	DEF-1	BC-1	DEF-1	084M	DEF-1	BC-1	DEF-1	A-1	B-1	B-2	C-1	C-2	D-1	D-2	
Cultivated	L	0	0	0	0	0	0	0	0	84	668	10	218	8	14	6	6	
Pasture land	P	0	0	0	0	0	0	2	0	3	24	0	5	0	0	2	2	
Forest	F	0	0	5	10	81	579	274	230	69	749	0	55	0	17	0	0	
Urban areas	H	0	0	0	0	0	0	0	0	1	5	86	0	21	0	0	0	0
Idle land	X	8	12	27	0	0	0	0	0	0	3	44	0	9	0	0	0	0
Total		8	12	32	10	81	581	274	231	164	1571	10	308	8	31	8		

Upland Soils—Continued

Soil Series	Holyoke						Gloucester						Foxon 124X			
	A-1	B-1	C-1	D-1	B-1	C-1	D-1	B-1	C-1	BC-1	DEF-1	A-1	B-1	C-1	D-1	A-1
Cultivated	L	1	36	12	0	45	25	1	0	3	0	0	0	26	3	1
Pasture land	P	4	31	34	3	5	3	7	1	8	0	0	11	0	0	8
Forest	F	16	348	91	39	3	14	154	34	172	159	506	17	0	0	23
Urban areas	H	0	13	2	1	4	0	0	2	1	0	0	2	2	0	0
Idle land	X	0	18	0	4	1	7	1	0	7	0	1	11	0	0	0
Total		21	446	139	47	58	49	163	37	191	159	507	67	5	32	

Upland Soils—Continued

Soil Series	Wilbraham						Haddam						Cheshire					
	284	284X	284M	334	334X	B-1	C-1	A-1	B-1	C-1	A-1	B-1	C-1	C-2	D-1	D-2		
Soil Symbols																		
Cultivated	L	40	0	0	8	0	0	53	327	98	41	5	5	11				
Pasture land	P	35	73	193	2	1	0	4	33	29	12	3	3	8				
Forest	F	54	119	751	1	18	0	3	17	22	5	0	0	5				
Urban areas	H	16	0	4	3	0	0	6	182	41	1	0	0	14				
Idle land	X	8	12	26	1	0	2	5	61	25	3	0	0	4				
Total		153	204	974	15	19	2	71	620	215	62	8	8	42				

Upland Soils—Continued

Soil Series	Cheshire						Wethersfield						384X					
	375X	B-1	C-1	D-1	A-1	BC-1	DEF-1	B-1	C-1	D-1	D-2	B-1	C-1	D-1				
Soil Symbols																		
Cultivated	L	0	27	0	0	0	0	26	17	3	10	3	2	0				
Pasture land	P	0	2	30	0	0	24	1	0	0	0	0	0	0				
Forest	F	14	178	128	3	110	521	78	1	0	2	0	0	35	0			
Urban areas	H	0	14	0	0	0	1	0	7	0	0	2	0	0				
Idle land	X	0	4	0	0	0	8	1	20	0	0	0	0	0	8	8		
Total		14	225	158	3	110	554	80	54	17	5	12	3	45	8			

Upland Soils — Continued

Upland Soils — Continued

Soil Series	Ludlow						Birchwood						Action			Towaco	
	564			564X			564M			616			874			874X	944
	A-1	B-1	C-1	A-1	B-1	A-1	BC-1	A-1	BC-1	A-1	B-1	A-1	B-1	A-1	B-1	BC-1	
Cultivated L	15	19	5	0	4	0	0	0	0	57	21	3	2	2	10		
Pasture land P	16	11	3	0	9	6	81	0	0	0	0	0	0	0	0		
Forest F	15	6	0	60	105	92	562	0	0	0	0	5	29	8			
Urban areas H	2	1	0	0	0	0	11	14	11	5	5	0	0	0	0		
Idle land X	8	26	5	4	19	0	7	8	8	1	3	0	0	0	0		
Total	56	63	13	64	137	98	661	79	40	14	34	14	34	18			

Upland Soils — Continued

Soil Series	Towaco						Scituate						Broad Brook						Total		
	944M			944R			1024			1024X			156V			156VX			Upland Soils		
	BC-1	DEF-1	BC-1	DEF-1	BC-1	DEF-1	B-1	B-1	B-1	A-1	B-1	C-2	A-1	B-1	C-1	B-1	C-1	Total			
Cultivated	L	0	0	0	0	0	2	0	0	0	8	1	17	42	42	0	0	2148			
Pasture land	P	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	884
Forest	F	751	540	78	1059	0	8	2	4	0	0	10	0	0	0	0	0	0	0	0	10741
Urban areas	H	5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	538
Idle land	X	3	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	489
Total		759	540	78	1059	4	8	2	22	1	27	42	1	27	42	3	3	14799			

Table 11. Acreage and Use of Soils in Southington and Plainville, Connecticut: Alluvial Soils

Soil series		Mixed		Alluvium		Cromwell		Ondawa		Podunk		Saco		Middlefield		Rumney		Total Alluvial Soils
		A-1	A-1	58	71V	806	807	816	81V	823	825	83V	853	855	A-1	A-1	A-1	
Cultivated	L	0	2	1	1	0	0	34	0	2	7	0	2	28	2	28	76	
Pasture land	P	0	0	0	0	0	0	18	0	85	60	0	21	36	21	36	220	
Forest	F	21	6	0	0	2	50	3	259	315	2	21	72	72	751	751	751	
Urban areas	H	0	0	0	0	0	0	0	0	0	33	0	0	0	0	8	8	
Idle land	X	83	0	0	0	0	5	0	83	110	0	4	4	57	57	41	41	
Total		104	8	1	2	107	3	429	525	2	48	201	1430					

Miscellaneous Soils

Soil Series	Balch Peat		Waterboro Muck		Sandy Gravelly Terrace Breaks		Gravel Pits		ML		Unclassified Soils		Misc. Soils		Total All Soils	
	A-1	A-1	91	93	93N	1580	DEF-1									
Cultivated	L	0	0	0	0	57	0	8	8	0	0	65	65	5264	5264	5264
Pasture land	P	0	3	0	0	27	4	8	8	0	0	42	42	1638	1638	1638
Forest	F	21	311	0	0	836	4	56	56	0	0	1228	1228	16565	16565	16565
Urban areas	H	0	4	0	0	227	44	488	488	737	737	1500	1500	4350	4350	4350
Idle land	X	0	0	149	41	18	54	0	0	0	0	262	262	2582	2582	2582
Total		21	318	149	1188	70	614	737	737	3644	3644	30399	30399	547	547	547